

1. A critical temperature indicator which provides an irreversible visual indication that the indicator has been exposed to a predetermined critical temperature, which includes:

a transparent housing; and

5 a temperature sensitive transformable material operably contained within said transparent housing which includes mixture of water, latex, and INA microorganism which is translucent prior to exposure of a predetermined temperature and is transformed upon being subjected to said predetermined temperature to render a substantially consistent opaque material thus precluding visibility therethrough and thereby providing
10 a sure visual sign that said indicator has been subjected to said predetermined temperature.

2. The critical temperature indicator of claim 1, wherein said latex includes particles having a diameter of less than about 0.05 microns.

3. The critical temperature indicator of claim 1, wherein said latex is present in said
15 material in an amount of from about 5 to 35 weight percent.

4. The critical temperature indicator of claim 1, wherein said INA agent is present in said material in an amount of from about 0.01 to 1.0 weight percent.

5. The critical temperature indicator of claim 1, wherein said INA agent includes ice nucleating active (INA) microorganisms which contain a molecular structure to attract
20 said water and which upon reaching said predetermined temperature interacts with said latex to form said opaque material.

6. The critical temperature indicator of claim 1, wherein said latex includes one of acrylic, nitrile, polychloroprene, paraffin, polyethylene, waxes, styrene-butadiene, vinyl

pyridine based, styrene polymers, styrene/butadiene copolymers, styrene/acrylic acid copolymers, vinyltoluene/tertiarybutyl styrene copolymers, vinylidene chloride/vinyl chloride copolymers or mixtures thereof.

7. The critical temperature indicator of claim 1, which further includes a colored
5 substrate operably disposed with respect to said housing such that said colored substrate can be seen through said housing while said material is in said transparent state and is substantially invisible when said material is opaque.

8. The critical temperature indicator of claim 7, wherein said colored substrate forms part of backing to which said housing is sealably connected.

10 9. The critical temperature indicator of claim 7, wherein said backing has an exposed surface having a self adhesive material applied thereto.

10. The critical temperature indicator of claim 7, wherein said substrate is a colored strip contained within said housing.

11. The critical temperature indicator of claim 1, which further includes a stabilizer
15 for said INA microorganism.

12. A critical temperature indicator which provides an irreversible visual indication that the indicator has been exposed to a predetermined critical temperature, which includes:

a transparent housing; and

20 a temperature sensitive transformable material operably contained within said transparent housing which includes mixture of water, latex, and INA microorganism which is translucent prior to exposure of a predetermined temperature and is transformed upon being subjected to said predetermined temperature to render a substantially

consistent opaque material thus precluding visibility therethrough and thereby providing a sure visual sign that said indicator has been subjected to said predetermined temperature, wherein said INA agent includes ice nucleating active (INA) microorganisms which contain a molecular structure to attract said water and which upon
5 reaching said predetermined temperature interacts with said latex to form said opaque material.

13. The critical temperature indicator of claim 12, wherein said latex includes particle size having a diameter of less than about 0.05 microns.

14. The critical temperature indicator of claim 12, wherein said latex is present in said
10 material in an amount of from about 5 to 35 weight percent.

15. The critical temperature indicator of claim 12, wherein said INA nucleating agent is present in said material in an amount of from about 0.01 to 1.0 weight percent.

16. The critical temperature indicator of claim 12, wherein said latex includes one of acrylic, natural, nitrile, polychloroprene, paraffin, polyethylene, waxes, styrene-
15 butadiene, vinyl pyridine based, styrene polymers, styrene/butadiene copolymers, styrene/acrylic acid copolymers, vinyltoluene/tertiarybutyl styrene copolymers, vinylidene chloride/vinyl chloride copolymers or mixtures thereof.

17. The critical temperature indicator of claim 12, which further includes a colored substrate operably disposed with respect to said housing such that said colored substrate
20 can be seen through said housing while said material is in said transparent state and is substantially invisible when said material is opaque.

18. The critical temperature indicator of claim 17, wherein said colored substrate forms part of backing to which said housing is sealably connected.

19. The critical temperature indicator of claim 17, wherein said backing has an exposed surface having a self adhesive material applied thereto.
20. The critical temperature indicator of claim 17, wherein said substrate is a colored strip contained within said housing.
- 5 21. The critical temperature indicator of claim 12, which further includes a stabilizer for said INA microorganism.
22. A critical temperature indicator which provides an irreversible visual indication that the indicator has been exposed to a predetermined critical temperature, which includes:
- 10 a transparent housing;
- a temperature sensitive transformable material operably contained within said transparent housing which includes mixture of water, latex, and INA microorganism which is translucent prior to exposure of a predetermined temperature and is transformed upon being subjected to said predetermined temperature to render a substantially
- 15 consistent opaque material thus precluding visibility therethrough and thereby providing a sure visual sign that said indicator has been subjected to said predetermined temperature; and
- a colored substrate operably disposed with respect to said housing such that said colored substrate can be seen through said housing while said material is in said
- 20 transparent state and is substantially invisible when said material is opaque.
23. The critical temperature indicator of claim 22, wherein said latex includes particle size having a diameter of less than about 0.05 microns.

24. The critical temperature indicator of claim 22, wherein said latex is present in said material in an amount of from about 5 to 35 weight percent.
25. The critical temperature indicator of claim 22, wherein said INA microorganism is present in said material in an amount of from about 0.01 to 1.0 weight percent.
- 5 26. The critical temperature indicator of claim 22, wherein said INA microorganism includes ice nucleating active (INA) microorganisms which contain a molecular structure to attract said water and which upon reaching said predetermined temperature interacts with said latex to form said opaque material.
- 10 27. The critical temperature indicator of claim 22, wherein said latex includes one of acrylic, natural, nitrile, polychloroprene, paraffin, polyethylene, waxes, styrene-butadiene, vinyl pyridine based, styrene polymers, styrene/butadiene copolymers, styrene/acrylic acid copolymers, vinyltoluene/tertiarybutyl styrene copolymers, vinylidene chloride/vinyl chloride copolymers or mixtures thereof.
- 15 28. The critical temperature indicator of claim 22, wherein said colored substrate forms part of backing to which said housing is sealably connected.
29. The critical temperature indicator of claim 22, wherein said backing has an exposed surface having a self adhesive material applied thereto.
30. The critical temperature indicator of claim 22, wherein said substrate is a colored strip contained within said housing.
- 20 31. The critical temperature indicator of claim 22, which further includes a stabilizer for said INA microorganism.